

**Listing of Claims**

1. (Previously presented) A method of artifact correction in a data set of an object of interest, the method comprising the step of: reconstructing an image of the object of interest on the basis of the data set; wherein a statistical weighing is performed during reconstruction of the image, wherein the reconstruction of the image is performed on the basis of an iterative algorithm comprising a plurality of update steps until an end criterion has been fulfilled, wherein each update step comprises subtractions weighted with an intrinsic statistical error  $\sigma_y$ , based on measured photon counts  $Y_i$ , wherein  $\sigma_y$  is the square root of  $Y_i$ .
2. (Original) The method according to claim 1, wherein the data set is a projection data set acquired by means of a source of electromagnetic radiation generating a beam and by means of a radiation detector detecting the beam.
3. (Original) The method according to claim 2, wherein the source of electromagnetic radiation is a polychromatic x-ray source; wherein the source moves along a helical path around the object of interest; and wherein the beam has one of a cone beam geometry and a fan beam geometry.
4. (Cancelled)
5. (Previously presented) The method according to claim 1, wherein the iterative algorithm is a maximum likelihood algorithm; wherein the reconstructed image has the highest likelihood; and wherein the weighing is performed in each update step of the plurality of update steps.
6. (Original) The method according to claim 2, further comprising the step of: determining a number of detected photons during acquisition of the data set; wherein the weighing is based on a statistical error of the number of detected photons.

7. (Original) The method according to claim 5, further comprising the step of: determining a number of detected photons  $Y_i$  during acquisition of the data set; wherein the weighing is based on a statistical error  $\sigma_{Y_i}$  of the number of detected photons  $Y_i$ ; wherein an update of an attenuation parameter  $\mu_j^{n+1}$  is calculated from the attenuation parameter  $\mu_j^n$  by

$$\mu_j^{n+1} = \mu_j^n + \mu_j^n \frac{\sum_i l_{ij} [d_i e^{-\langle l_i, \mu^n \rangle} - Y_i] / \sigma_{Y_i}^2}{\sum_i l_{ij} < l_i, \mu^n > d_i e^{-\langle l_i, \mu^n \rangle}}$$

wherein  $d_i$  is a number of photons emitted by the source of radiation;  
wherein  $l_{ij}$  is a basis function of an i-th projection;  
wherein  $l_i$  is a vector of basis functions  $l_{ij}$  of the i-th projection; and  
wherein  $\langle l_i, \mu \rangle = \sum_j l_{ij} \mu_j$  is an inner product.

8. (Original) The method according to claim 2, wherein the reconstruction of the image is based on a sub-set of at least two projections of all acquired projections of the projection data set.

9. (Previously presented) A data processing device, comprising: a memory for storing a data set of an object of interest; a data processor for performing artifact correction in the data set of the object of interest, wherein the data processor is adapted for performing the following operation: loading the data set; reconstructing an image of the object of interest on the basis of the data set; wherein a statistical weighing is performed during reconstruction of the image; wherein the weighing comprises an intrinsic statistical error  $\sigma_{Y_i}$  based on measured photon counts  $Y_i$ , where  $\sigma_{Y_i}$  is the square root of  $Y_i$ .

10. (Original) The data processing device according to claim 9, wherein the reconstruction of the image is performed on the basis of an iterative algorithm comprising a

plurality of update steps until an end criterion has been fulfilled; wherein the iterative algorithm is a maximum likelihood algorithm; wherein the reconstructed image has the highest likelihood; and wherein the weighing is performed in each update step of the plurality of update steps.

11. (Cancelled)

12. (Previously presented) An apparatus for performing artifact correction in a data set of an object of interest, comprising:

a processor; and

a computer readable storage medium encoded with computer executable instructions which, when executed by the processor, causes the processor to perform the following operation loading the data set; and

reconstructing an image of the object of interest on the basis of the data set; wherein a statistical weighing is performed during reconstruction of the image; wherein the weighing comprises an intrinsic statistical error  $\sigma_{Y_i}$  based on measured photon counts  $Y_i$ , where  $\sigma_{Y_i}$  is the square root of  $Y_i$ .

13. (Previously presented) The method of claim 1, wherein the end criterion is met only when a difference between consecutive updates does not exceed a threshold value, wherein the threshold value is defined; wherein if the end criterion is not met a counter is increased by one and iterations continue.

14. (Cancelled)

15. (Previously presented) The apparatus of claim 12, wherein the apparatus is connected to a memory for storage of an image depicting an object of interest.

16. (Previously presented) The apparatus of claim 12, wherein the apparatus is connected to a plurality of input/output network and diagnostic devices for further analysis and display of stored data and information.

17. (Previously presented) The apparatus of claim 12, wherein the apparatus is further connected to a motion monitor which may monitor the physiological capacities of an object of interest.

18. (Previously presented) The apparatus according to claim 12, wherein the processor also determines a number of detected photons during acquisition of the data set.

19. (Previously presented) The apparatus of claim 12, wherein the processor further sets a set of attenuation parameters  $\mu_j$  to an initial value, wherein each attenuation parameter  $\mu_j$  belongs to a respective interval along a projection of an i-th projection.

20. (Previously presented) The apparatus of claim 12, wherein the processor further calculates the attenuation parameters  $\mu_j$  by:

$$\mu_i^{n+1} = \mu_i^n + \mu_i^n \cdot \frac{\sum_i l_i \left[ d_i e^{-\langle l_i, \mu^* \rangle} - Y_i \right] / \sigma_{Y_i}^2}{\sum_i l_i / \sigma_{Y_i}^2}$$

wherein  $d_i$  is a number of photons emitted by the source of radiation; wherein  $l_{ij}$  is a basis function of an i-th projection; wherein  $l_i$  is a vector of basis functions  $l_{ij}$  of the i-th projection; and wherein  $\langle l_i, \mu \rangle = \sum_j l_{ij} \mu_j$  is an inner product.

21. (Previously presented) The apparatus according to claim 12, wherein the reconstruction of the image is based on a sub-set of at least two projections of all acquired projections of the projection data set.